FEDERAL AID
ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 25526
Juneau, AK 99802-5526

PROJECT TITLE: Effects of oil field development on calf production and survival in the Central Arctic Herd

PRINCIPAL INVESTIGATORS: Stephen M. Arthur and Patricia Del Vecchio

COOPERATORS: ConocoPhillips Alaska, Inc.; U.S. Bureau of Land Management (BLM); U.S. National Park Service (NPS); and U.S. Fish and Wildlife Service (FWS).

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NR: W-33-3

PROJECT NR: 3.46

WORK LOCATION: Game Management Unit 26B

STATE: Alaska

PERIOD: 1 July 2004–30 June 2005

I. PROGRESS ON PROJECT OBJECTIVES SINCE PROJECT INCEPTION

OBJECTIVE 1: Estimate annual pregnancy and birth rates of caribou cows.

Pregnancy and birth rates were assessed by locating radiocollared cows annually during early June 2001–2005.

OBJECTIVE 2: Estimate survival of female calves to yearling age class and determine causes of mortality.

Calves were captured and radiocollared annually during June 2001–2005. Calves were monitored at approximately 2-week intervals during June–September, then located again in March and June of the following years to estimate survival rates.

OBJECTIVE 3: Estimate rates of growth and weight gain by calves during summer.

Radiocollared calves were captured, weighed, and measured during June, September, and March of each year to assess growth rates.

OBJECTIVE 4: Assess changes in location, physiography, and vegetation of calving sites among years.

Location and vegetation types were recorded and photographed at initial capture sites of calves. These data will be analyzed to detect changes in location and habitat use that may occur over time.

OBJECTIVE 5: Monitor movements of caribou to determine winter and summer distributions.

Radiocollared calves were located at 2-week intervals during June–September. In addition, radiocollared cows were located during late February and early March 2002–2005 to record winter concentration areas.

OBJECTIVE 6: Estimate size of the herd at 2–year intervals using a complete aerial photo census.

An aerial photocensus was conducted during July 2002. The herd was estimated at 31,857 caribou.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB 1: Estimate annual pregnancy and birth rates of caribou cows.

Twenty-seven radio collared caribou were captured during September 2004, so that the collars could be replaced with GPS-equipped collars provided by the BLM. In addition, 16 caribou cows with older GPS collars were captured during March 2005, so that the collars could be recovered. Five of these collars were replaced with new GPS collars provided by the FWS (Arctic National Wildlife Refuge), 5 were replaced with conventional VHF radio collars, and 6 caribou were released without collars. No caribou sustained significant injuries during these captures.

Radiotracking surveys were conducted on 29 May–10 June 2005 to determine the proportion of cows that gave birth and the distribution of cows during the calving period. Sixty-seven radiocollared adult (≥3 years old) cows, including both GPS and VHF radio collars, were located during this period. Parturition rate was 85%.

JOB 2: Estimate survival of female calves to yearling age class and determine causes of mortality.

Sixty-three neonatal calves were captured and radiocollared 1–11 June 2004, in the previous report period. Natural mortalities that occurred prior to the start of this report period are reported here because survival calculations must include all mortalities from a calf cohort, not just those occurring within the report period.

Thirty calves were captured in the eastern and 33 in the western calving areas, including 40 calves (24 female, 16 male) of GPS-collared cows and 23 female calves of uncollared cows. Three calves died between 1–11 June (1 from the eastern and 2 from the western calving areas) and 8 died between 12 June and 7 September (1 eastern and 7 western calves). An additional 14 calves died between September 2004 and March 2005 (7 from each area), and 2 (eastern) calves died between March and June 2005. Kaplan–Meier estimates of calf survival

from capture through 7 September were 0.97 (SD = 0.03), and 0.77 (SD = 0.07) for calves captured in the eastern and western areas, respectively. Survival until the age of 1 year was 0.59 (0.08) and 0.45 (0.06) for eastern and western calves. Sixty-eight calves were captured during 31 May–10 June 2005 and will be monitored during FY06. These included 23 calves (10 female, 13 male) of GPS-collared cows and 45 female calves of uncollared cows. No calves were injured during captures; however, disturbance during capture may have contributed to some deaths that occurred within a few days following capture. These included 3 and 8 calves that died within a week of capture during June 2004 and 2005, respectively. Proximate causes of these deaths were predation, congenital defects, and lack of care by the mother.

JOB 3: Estimate rates of growth and weight gain by calves during summer.

Weights and metatarsus lengths were recorded for all calves captured in June, September, and March. Fifty-one calves (37 F, 14 M) were captured by net gun during September 2004 and 29 (20 F, 9 M) were captured during March 2005. No serious injuries occurred during these captures. Mean weights during early June 2004 for calves from the eastern and western calving areas were 6.79 and 6.74 kg, respectively. Mean weight gain from June to September 2004 was 34.16 (eastern calves) and 34.53 kg (western calves). Mean weight gain from September 2004 to March 2005 was 1.73 kg (eastern calves) and 1.43 kg (western calves). Mean metatarsus lengths during June 2004 were 26.35 (eastern calves) and 25.75 cm (western calves). Change in metatarsus lengths averaged 6.55 (eastern calves) and 7.44 cm (western calves) from June to September 2004 and 1.85 (eastern calves) and 1.99 cm (western calves) from September 2004 to March 2005. Mean weights of calves captured during June 2005 were 6.81 and 6.51 for eastern and western calves, respectively, and mean metatarsus lengths were 26.87 (eastern calves) and 26.06 cm (western calves).

JOB 4: Assess changes in location, physiography, and vegetation of calving sites among years.

Locations of captures during early June were assumed to indicate birth location, because captured calves exhibited physical and behavioral traits characteristic of newborn caribou (lack of coordination, small size, appearance of umbilicus, hooves, posture), and because caribou usually do not travel far during the first week following birth of calves. These locations were mapped and will be compared to similar data during each year of the study. Vegetation at each site was classified and photographed for future, more detailed analysis.

JOB 5: Monitor movements of caribou to determine winter and summer distributions.

Radiocollared calves were located by aerial radiotracking at approximately 2-week intervals from June through September. Distributions of collared calves were recorded and mapped using fixed kernel utilization distribution models encompassing 50% and 99% of the utilization distributions. During July, August, and September, calves from both calving areas were mostly found east of the Dalton Highway and ranged across western portions of the Arctic National Wildlife Refuge as far east as the Hulahula River. Caribou use of areas west of the Dalton Highway was much less during summer 2004 than during 2001–2003 and previous years. Data from GPS collars on caribou cows was used to document migration routes, and radiocollared cows and calves were located in March 2005 to document the herd's winter distribution. During September 2004, some CAH caribou moved south along

the Middle Fork of the Chandalar River, then east through the southern Brooks Range to the Colleen River, before returning westward to wintering areas south and west of Arctic Village. Approximately 60% of the CAH wintered in the southern Brooks Range, while the remainder wintered in the northern Brooks Range foothills between the Ribdon and Canning Rivers. Although many caribou were seen along the Dalton Highway north of Wiseman during March 2005, no radiocollared CAH caribou were found in this area. Thus, these caribou probably were part of the Teshekpuk or Western Arctic herds.

JOB 6: Estimate size of the herd at 2–year intervals using a complete aerial photo census.

A photo census was planned for this period but was postponed because the herd did not form the dense aggregations needed to conduct the census. The photo census has been rescheduled for summer 2006.

JOB 7: Prepare annual report, travel to meetings and conferences.

No meetings and conferences were charged to this grant.

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

IV. PUBLICATIONS

None

V. RECOMMENDATIONS FOR THIS PROJECT

Fieldwork is scheduled to continue until March 2006. In addition, we have proposed expanding this study to use detailed data on caribou movements to develop spatially explicit models of caribou exposure to anthropogenic disturbance. In addition to demographic and physiological data, we will collect detailed data on spring, summer, and fall movements and exposure of caribou to industrial activity to investigate the influence of oil field development on caribou population dynamics. Objectives of this expanded study would be to:

1. Estimate annual rates of calf production, survival, and growth.
2. Determine distributions of pregnant caribou cows during the calving period each year.
3. Monitor movements of cow–calf pairs every 5 hours during spring, summer, and fall.
4. Examine the relationships among demographic parameters (Objective 1) and birth location, habitat characteristics, and movements, and exposure to human activity.
5. Investigate the potential for human activities to influence caribou movements during late summer and fall.
6. Document distribution of CAH caribou throughout the year.

The BLM has committed significant funding to this project, and we are currently attempting to obtain the remaining required funds.

VI. APPENDIX

VII. PROJECT COSTS FOR THIS SEGMENT PERIOD

Stewardship Investment items purchased: none

FEDERAL AID SHARE $76,928 + STATE SHARE $25,642 = TOTAL $102,570

Additional project support was provided by the BLM ($110,000), FWS ($25,000), and NPS ($7500).

VIII. PREPARED BY:

Stephen M. Arthur
Wildlife Biologist III

Patricia Del Vecchio
Wildlife Technician IV

SUBMITTED BY:
Mark E. McNay
Research Coordinator

Laura A. McCarthy
Publications Technician II